History of Blowing Agents in Foam Insulation

The basic chemistry of foam insulation requires a chemical reaction as result of combining two parts typically known as Part A and Part B. One of these parts must contain the required blowing agent which creates the necessary cell structure and mass. When foams were initially produced in the 1990’s, this agent was often a R-11 or R-12 and commonly known as a CFCs (Chlorofluorocarbons). These catalysts with them a high level of ODP (Ozone Depleting Potential) which subsequently caused the design industry to negatively perceive foams for the building environment.

With the introduction of the Montreal Protocol, CFCs were phased out of use and the industry turned to HCFCs (Hydrochlorofluorocarbons). HCFCs were slightly better in creating less ODP however, still carried a significant amount of GWP (Global Warming Potential). Further innovations through use of HFCs (Hydrofluorocarbons) as the blowing agent allowed different versions that conformed to individual manufacturing processes. The first version of HFC was banned in 2003. Manufacturers turned to using newer versions of HFC that have since become under scrutiny at the federal level and now at the state level. Individual State bans are going into effect, specifically EPA Rule 21.

Currently, blowing agents are now HFOs (Hydrofluoroolefins) or Olefins. Positive traits include maintaining thermal restrictive flow while having a significantly lower ODP as well as GWP. A GWP rating of 1 is the lowest, any product can be when dealing with insulation material as it is the equivalent of water. Water needs to convert to carbon dioxide to create the foam reaction within the process and subsequently causes more heat during the reaction. As result, HFOs could in theory, have less water potential indexes than water itself.

The Montreal Protocol on Substances that Deplete the Ozone Layer, signed in 1987 and effective from 1989 having undergone several revisions since, is an international treaty designed to protect the ozone layer by phasing out production of substances responsible for ozone depletion.

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“The most dangerous kind of waste, is the waste we do not recognize.”
~Shigeo Shingo, considered by many as the World’s leading expert on manufacturing and the Toyoto production system.

Whether you are a part of the movement for climate change awareness or not, few can argue that human kind has, is, and will continue to make an impact on the World on which we live. At MaxLife we believe part of our duty is to preserve our world to ensure future generations have a place to live, work, and play. Part of that sustainability is to construct with longer term life cycles in mind, transcending old technology and methodology to produce and adopt greener materials. The products we manufacture use cleaner materials and our process produces lower emissions.

**MaxLife’s Commitment to the Environment**

As a prominent member of the insulation manufacturing industry, MaxLife’s ArmorWall Structural Insulated Sheathing™ uses only insulation components that carry a GWP of 1 in addition to a ODP of 0. Our manufacturing process further lessens environmental impact as the unique and patented fusion technology allows a “pourable” rigid polyurethane foam that is injected rather than sprayed as is traditionally done on the jobsite for field-formed panels or sprayed-in-place insulation. Spray foams require higher reactivity hence faster reactants. Injecting a pourable material within a controlled plant environment allows a controlled reaction time, significantly reducing the production carbon footprint. MaxLife strives to provide better products for High-Performance buildings of today and for the future.

**LEED v4**

Insulation used within all versions of ArmorWall Structural Insulated Sheathing™ have been tested to comply with LEED v4: Indoor air TVOC concentrations < 0.5 mg/m3 for Private Offices and between 0.5 and 5.0 mg/m3 for School Classrooms and Single-Family Residences.

**VOCs (Volatile Organic Compounds)**

Insulation used within all versions of ArmorWall Structural Insulated Sheathing™ have been tested to comply with the California Department of Public Health CDPH 03150 v1.2 Table 4-1 for School Classroom, Private Office, and Single-Family Residence scenarios as defined in Tables 4-3, 4-5, and B-2 respectively for thermal insulation applications.

**R-Value**

Insulation used within all versions of ArmorWall Structural Insulated Sheathing™ have been tested to demonstrate an achieved R-Value of R6.5 per inch per ASTM C518; maintaining the highest R-Value in the industry for performance.